

No regrets – sustaining adaptive rural livelihoods in Eastern Indonesia

Enhancing the adaptive capacity of rural communities in Indonesia's Nusa Tenggara Barat Province, one of the world's least-developed regions.



The issue

The islands of eastern Indonesia have some of the highest levels of poverty and food insecurity in the country. Most people live in rural communities and derive their livelihoods from farming, fishing and small-scale local industries. They are highly vulnerable to changes in rainfall and weather patterns that affect crop yields, livestock and fisheries, and natural disasters such as floods, drought and storms. Extremes are becoming more frequent and intense as the global climate changes, exacerbated by population growth, fluctuating commodity prices and rising costs of living. Currently, there is little information available to project the potential impacts of climate and other changes on rural communities, and no planning processes which can pro-actively anticipate them.



Our approach

Working with researchers, government agencies and communities on the islands of Lombok and Sumbawa in Nusa Tenggara Barat (NTB) Province, Indonesia, (yellow areas on above map), this project built a multi-disciplinary team and equipped them with analytical skills and tools to identify vulnerable communities. Through a novel participatory planning approach which co-produced knowledge and learning by policy, community and research stakeholders alike, as well as mitigating power imbalances and creating ownership of problems and solutions, the team developed ‘no regrets’ adaptation strategies. ‘No regrets’ strategies deliver benefits under any future conditions of change. The project was managed as a partnership between CSIRO and the University of Mataram (UNRAM) from 2010-2014. It engaged provincial and local governments, civil society groups, businesses and communities in planning and testing livelihood options that could enhance vulnerable communities’ incomes, while building the resilience of all stakeholders to long term change and uncertainty. The project was intended to demonstrate an adaptation planning approach that could be scaled out in other rural regions of Indonesia.

DFAT-CSIRO Research for Development Alliance

This project was funded by the Research for Development (R4D) Alliance, a strategic partnership tackling complex development challenges in the Asia Pacific region

Key lessons for development

- Climate change impacts vary widely across islands, requiring locally-specific adaptation planning. In many areas, population growth and the loss of agricultural land will have a far greater impact than climate change.
- Government, NGOs, and science and community stakeholders have different perspectives regarding livelihood problems and solutions. This requires multi-stakeholder planning processes to understand and integrate the varied views.
- Multi-stakeholder planning, while time-consuming, greatly enhances participants’ adaptive capacity by catalysing innovation, new partnerships and empowering vulnerable communities.
- The causes of community vulnerability are highly complex and dynamic. Many values and rules governing decision-making are changing, such as women’s empowerment. These trends also present some paradoxes. For example, the decline in traditional institutions precipitated by modernisation erodes customary ecosystem stewardship and mutual assistance practices that are important for the poor, but also enables women’s education and leadership.

Project partners

CSIRO, University of Mataram (UNRAM), Indonesian Agricultural Technology Assessment Agency (BPTP), Indonesian Bureau of Meteorology and Geosciences (BMKG), NTB Government’s Climate Change Task Force, NTB Planning Agency (Bappeda), NTB Environmental Research Board (BLHP), NTB Food Security Agency, United Nations World Food Program (WFP), Indonesian Ministry of the Environment, Australian Department of Foreign Affairs and Trade (DFAT), EcoRegions Indonesia (ERI).

Key achievements

OUR STORY

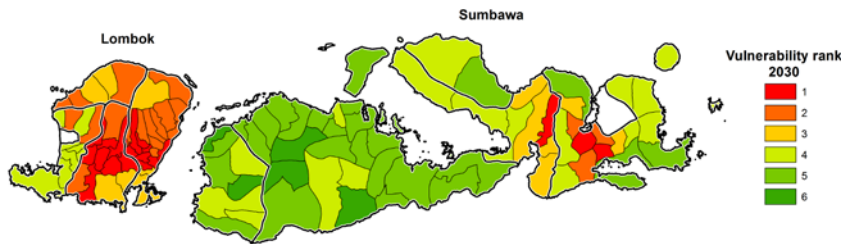


Figure 1. The Vulnerability Atlas for NTB sub-districts showing projections for 2030

What did the project deliver?

A Vulnerability Atlas of NTB Province was produced by combining a livelihoods typology with projected impacts of climate change and population growth, and current adaptive capacity. The Vulnerability Atlas highlighted sub-districts where adaptation planning should be prioritised (Fig. 1).

‘No regrets’ adaptation strategies were developed with vulnerable communities, based on their specific local needs. The research team, local farmers and fishermen tested 12 strategies in five case study sub-districts in Lombok.

A novel participatory planning method was developed by researchers from UNRAM and CSIRO, and the Indonesian BPTP and BMKG which integrated the data, tools and facilitation skills necessary for adaptation planning. The method was successively applied and refined by the team through five sub-district case studies.

How is it being used?

The WFP has applied the Vulnerability Atlas to guide their food security and resilience program, and has secured funding for the implementation of adaptation strategies. The atlas was also incorporated into both the NTB Government’s Food and Nutrition Action Plan 2012, and the Strategy and Action Plan for Food Security and Climate Change.

Several of the adaptation strategies have since been adopted, funded and scaled out by government agencies, the private sector and communities. These include:

- alternative *bondre* seaweed production that is more resilient to storms than traditional production methods. On average, this strategy could increase household welfare by \$500-\$600 AUD per annum, which is greater than the provincial GDP per capita.
- inter-cropping of maize, castor and mung beans to increase productivity and reduce the risk of crop loss from variable weather. On average, this strategy could increase household welfare by \$300-\$400 AUD per year, roughly equivalent to the provincial GDP per capita.

Leadership and trust emerged within the research team, the agents of change and community participants. New partnerships were created, data was shared and innovation was sparked.



What impact did the project have?

The Vulnerability Atlas will help governments and WFP to identify sub-districts where adaptation planning and action should be prioritised.



ERI adopted the adaptation strategies in one sub-district where they are implementing a novel eco-tourism development which promotes local food security.

The strategies are also being adopted and scaled-out through new partnerships between UNRAM, district governments and the Indonesian Ministry for Regional Development (KPDT), promoting greater adaptive capacity in the most vulnerable households and communities in NTB.

UNRAM is now better equipped to carry out integrated and inter-disciplinary research. The research team is becoming increasingly recognised amongst their peers, partners and communities as champions of adaptation and gender research. This has resulted in team members being employed by WFP’s Climate Change Adaptation Program in Jakarta and ERI, facilitating the linkages between the project and these partners.

Researchers and partners are expanding their professional networks and these interactions are continuing beyond the project. At an institutional level, understanding, trust and cooperation between agencies is increasing, with stronger links between BPTP, BMKG, BLHP and Bappeda.

Impact Pathway

The project’s objective was to *increase the adaptive capacity of rural communities, boundary partners and researchers to reduce vulnerability to adverse change*. To achieve this, the research team developed an Impact Pathway consisting of three linked phases (Fig. 2a). Phase 1 focused on ‘capacity building’. This enabled the allocation of resources and development of plans, agreements and new projects through Phase 2 ‘policy and program development’. Following on from Phase 2, Phase 3 ‘implementation, adoption and scaling out’ would occur. These phases would cumulatively build the adaptive capacity of the project stakeholders. However, while Phase 1 encompassed the project’s activities (solid line), Phases 2 and 3 were out of the project team’s direct control (dashed line). Consequently, the Impact Pathway was clear for Phase 1, but less so for Phases 2 and 3.

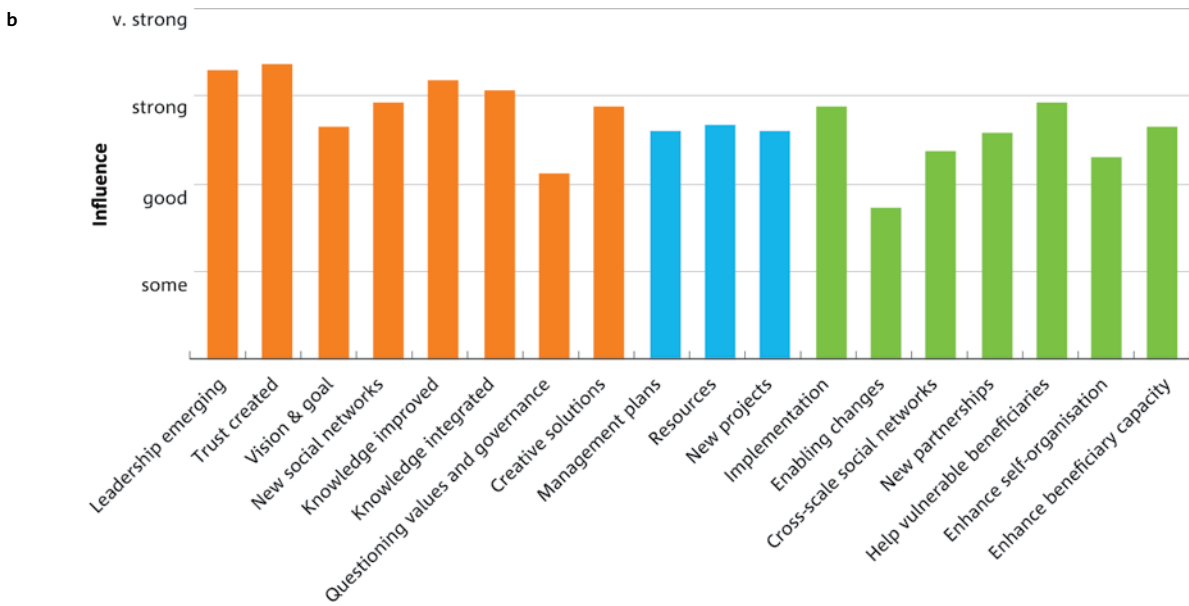
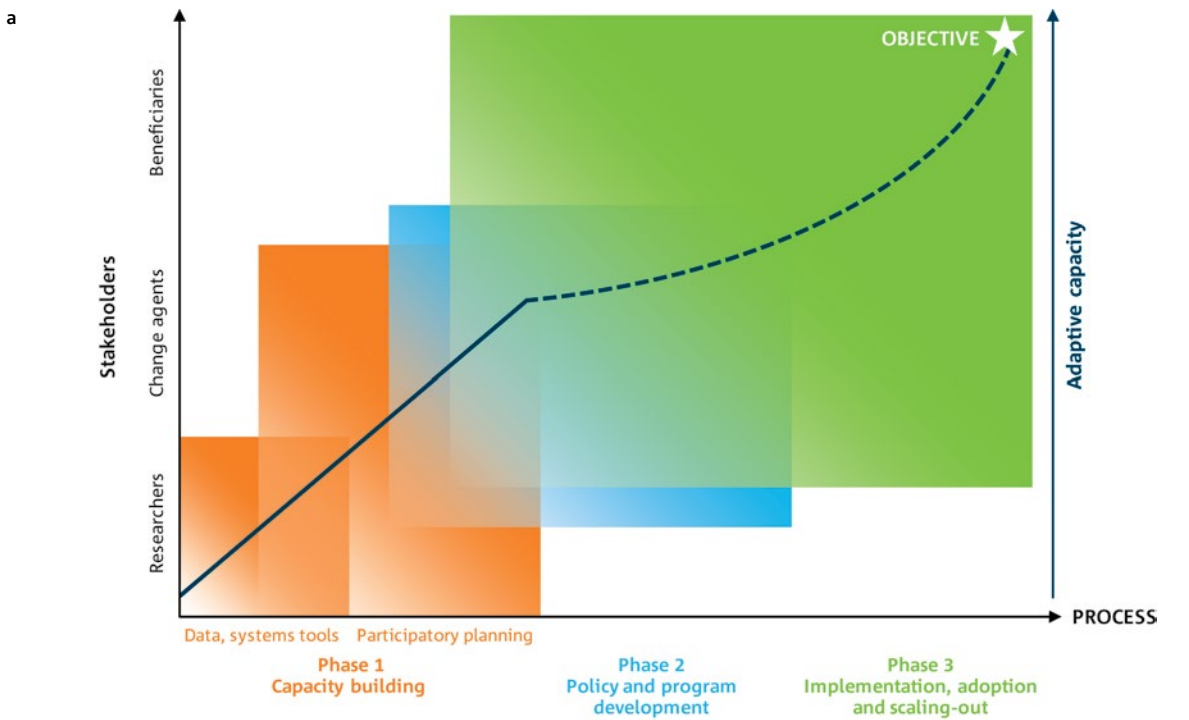


Figure 2. The project’s (a) Impact Pathway and (b) influence on adaptive capacity within the Impact Pathway’s three phases

Evaluating impact

To track the influence of the project on stakeholders' adaptive capacity, and to enable comparisons between all Alliance projects, a standardised set of 18 indicators was developed. According to the project's Impact Pathway, each phase encompassed a progressively wider group of stakeholders and the indicators were designed to assess change amongst them. Seventeen researchers and boundary partners involved in Phase 1 were interviewed at project completion, and asked to give their assessment of change by scoring each indicator, providing evidence for their scores. Results showed that there had been a positive influence for all indicators in all phases (Fig. 2b).

PHASE 1: Building capacity had the highest-scoring indicators:

- As anticipated, the project fostered the research team's leadership skills. UNRAM team members were recognised amongst their peers, boundary partners and communities as champions of inter-disciplinary adaptation and gender research. As a result, team members were employed by WFP's Climate Change Adaptation Program in Jakarta and ERI, which facilitated better connections between the project and these boundary partners.
- The project improved the trust and cooperation between individual participants and institutions. Individual participants appreciated the opportunity for training and evaluation to build their skills; and professional networks were developed through joint project activities, with these interactions continuing beyond the project. At an institutional level, there was an increase in understanding, trust and cooperation between agencies, with stronger links between BPTP, BMKG, BLHP and Bappeda.
- The project also strongly influenced the improvement and integration of knowledge. The majority of interviewees mentioned that their own and others' awareness of climate change and its impacts on livelihoods had increased. Several revealed that they had gained a better understanding of the problem's complexity, and appreciated learning a systems approach with mixed methods including scenario planning.

PHASE 2: Policy and program development had slightly weaker indicator scores.

- Management plans which include adaptation strategies were produced: the NTB Government's NTB Food and Nutrition Action Plan, and the Strategy and Action Plan for Food Security and Climate Change.
- New resources were created, with staff amongst partners allocated additional responsibilities to become involved in climate adaptation planning with other institutions. For example, WFP has employed a research team member to assist with their climate adaptation activities and ERI is funding a demonstration site and community adaptation planning in one sub-district case study.
- KPDT and the East Lombok District Government opened a 'show room' for seaweed in Lombok, highlighting the *bondre* seaweed production technique developed by the project.

Many new projects have also commenced, including:

- The WFP is using Payments for Ecosystem Services as a new food security strategy.
- The Indonesian Ministries of Education and Forestry will be undertaking research on climate change and adaptation nationally, with the invited participation of a team member.
- BMKG has joined the Asia Pacific Network Project, which allows them to further build their capacity for climate projections.
- Funding has been allocated by the NTB Government for adaptation strategy development in the case studies, including bee-keeping in North Lombok and maize inter-cropping in East Lombok.

PHASE 3: Implementation, adoption and scaling-out

indicators scored highly, with evidence of the project having implemented strategies amongst vulnerable case study communities, including:

- The *bondre* seaweed system was scaled-out from the initial focus village across East and West Lombok Districts in 2013 and 2014, with support from KPDT and the district governments.
- Project demonstration sites were set up by ERI and the East Lombok Climate Forum.
- Maize inter-cropping was also scaled out in partnership with ERI in East Lombok.
- The Payments for Ecosystem Services approach for conserving water sources under climate stress was implemented in three villages in Central Lombok as part of WFP's revised approach to food security projects.

Vulnerable case study communities were empowered through their involvement in the project's participatory planning workshops and the trialling of adaptation strategies. Throughout the project, women and other vulnerable groups were identified and invited to participate in the workshops, enabling them to contribute equally to decision-making and planning. For example, women's groups are processing cassava chips as a substitute for rice in North Lombok, diversifying their families' diets and providing alternative employment at home. The *bondre* seaweed system and bee-keeping trials are also creating jobs for women and children, especially in the wet season when stormy weather prevents fishing.

Overall, the adaptive capacity of communities scored relatively strongly, indicating that the outcomes and impacts in Phase 3 had collectively made progress towards the project's over-arching objective.

Benefit Cost Analysis of adaptation strategies

Benefit Cost Analysis (BCA) provides an additional approach to evaluation. It allows quantification of monetary benefits relative to funding invested, but is most readily applicable to evaluating impacts at the household or business level. A BCA was applied to two of the 12 adaptation strategies tested by the project: the maize, castor and mung bean inter-cropping, and alternative *bondre* seaweed production system. The characteristics of the remaining ten strategies did not lend themselves easily to this form of evaluation.

BCAs were made using three scenarios of adoption rates. The ‘most conservative’ scenario assumed that implementation does not continue, and no further

households adopt the strategy. Also, it was assumed under this scenario that the initial adopters did not continue to use the strategy after 2014. The two other scenarios assumed that diffusion of the strategies to other households continued at a similar rates to that observed in 2011-2014, until 2017 (5 year scenario), and 2022 (10 year scenario). Results showed that even with the most conservative assumptions, the maize inter-cropping had a near break-even benefit cost ratio, and the *bondre* seaweed production showed a near 3:1 benefit cost ratio (Table 1). If use persists for households that have already adopted these strategies, and more households adopt them, the benefit cost ratios could be even higher.

Table 1. Net Present Values of BCA for the maize inter-cropping and *bondre* seaweed production strategies under three scenarios of adoption rates

	MOST CONSERVATIVE		5-YEAR		10-YEAR	
	MAIZE INTER-CROPPING	<i>BONDRE</i> SEAWEED	MAIZE INTER-CROPPING	<i>BONDRE</i> SEAWEED	MAIZE INTER-CROPPING	<i>BONDRE</i> SEAWEED
Regional benefit (\$1,000)	56.8	211	142	551	3,500	24,520
Program cost (\$1,000)	84.0	77	144	120	248	206
BCA ratio	0.7	2.7	1	4.6	14	122.9



Alliance wide lessons

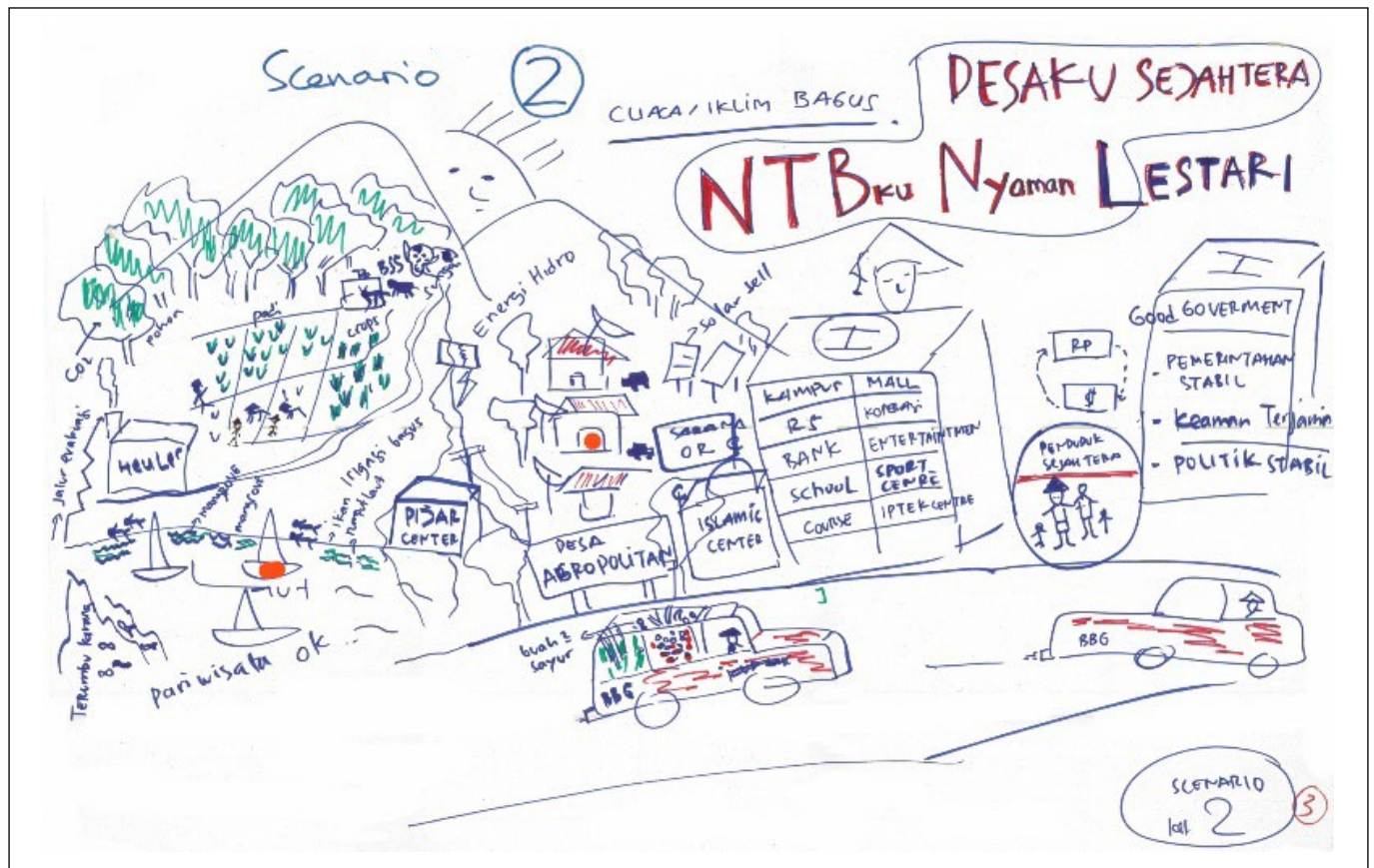
Designing investments to assist vulnerable communities in developing countries adapt to global change (e.g. globalised markets, population growth and climate) is typically complex. This is particularly true for the Alliance where our portfolio of multi-year projects focused on global development challenges related to climate, water resources, sustainable cities, and food security. Each of the projects involved multiple actors (e.g. planning, emergency services, and primary industries) at multiple scales (local, provincial, national and global) and over time, reflecting the broad domain of R4D.

Our experience is that the context-specific nature of these investments is best served by a well-informed approach to project structure and design. Practical learning from these projects can support the development of guidance to improve aid investment outcomes. Key findings included:

- **Strong partnerships and collaboration lead to better outcomes:** Partnerships can be developed or evolve in a number of ways, all of which can be effective. Our projects included partnerships where we led, where we worked with our in-country partners to build demand, and those where we responded to demand. These partnerships were formed and evolved around relationships and purpose. A general observation is that ‘pull’ type projects appear to have the most clearly articulated impact pathway at the national policy level and provide the least scope for expansion; whereas co-developed or evolutionary type projects provide greater flexibility and also more opportunities to broaden partnerships over the life of projects, which can significantly improve impact. In all cases, it takes time to build appropriate, effective communication processes and trust; especially when there are cultural and institutional differences. This can be expedited through ongoing in-country presence and two-way exchanges of personnel, which provides high strategic value but carries a high operational cost.
- **Capacity building and engagement:** Engagement early on (i.e. pre-project) provides a valuable platform for co-development of projects that are then shaped by and can be responsive to local context. This has the added value of building trust between partners, which can be increased over time through capacity building initiatives. Traditional develop-deliver skillsets such as two-way mentoring, use of trusted advisors and local champions to facilitate engagement, improved project management and engagement skills, remain important; however, our experience is that conjointly developed knowledge, products and services are more context-specific and tractable.
- **Participatory approaches:** Partner institutions have high levels of connectedness with government institutions and other boundary partners – giving the research a stronger pathway to impact and increasing its relevance. Participatory approaches can improve the status of research partners and encourage buy-in from key decision-makers, which is important for longer-term support. Participatory planning approaches also strengthen formal and informal networks amongst decision-maker communities and between decision-makers and researchers, building capacity of all participants.
- **Creation of and access to data:** Datasets that are well-structured and accessible will have ongoing value. Where mandates or jurisdictions are unclear and there is a limited history of data curation and sharing, a trusted relationship between parties needs to be developed in order to overcome such procedural and institutional challenges. A trusted third party can play an important role in these situations.
- **Scenario planning:** Scenario planning provides a structured and powerful tool to think about the future and challenges, especially where there are large uncertainties such as changes to natural systems (e.g. water and climate), changes in rules or an adjustment of goals (e.g. livelihood goals); and can be based on existing data, modelled, or a combination of both. Scenarios work best when elicited from in-country partners or developed in conjunction with in-country partners rather than imposed.
- **Systems thinking and approaches:** Systems approaches to better integrate biophysical with social and economic information are highly valued by project partners, from design through all stages of the project lifecycle to decision making. Systems approaches also promote participation from a broader range of stakeholders. In general most local research teams had limited experience of these approaches, including scenario planning, and Alliance activities significantly enhanced their capacity to understand and apply such systems tools.
- **Evaluation methods:** Assessments often take place in complex policy settings and systems where there are multiple actors. Accurately defining, measuring and attributing impacts is vital to describing and communicating the success of investments. The use of mixed methods approaches, and better understanding of which approaches work best under certain conditions, will improve the quality of impact evaluation studies and the articulation of impact. Also, the timely return of results to project research teams and partners is important to maintain the salience of results.

Steps required to maintain the Impact Pathway

- Establish and continue long-term demonstration sites for the implementation of adaptation strategies in the five case study sub-districts. Funding to establish these is required, although ERI is already implementing one demonstration site in East Lombok.
- Implement the participatory planning process for the remaining highly vulnerable sub-districts identified by the Vulnerability Atlas, which were not engaged by the project. In Central Lombok, the WFP may implement planning workshops in 2014-2019, but funding is required to undertake this in other sub-districts.
- Scale-out the participatory planning process through the NTB Environmental Research Board (BLHP) and the NTB Climate Change Task Force, and integrate this with the *musrenbang* annual district planning.
- Distribute information on the planning method to all sub-districts to allow them to apply the approach and to develop their own strategies. The NTB and district governments' Department of Village Empowerment should take this role.
- Establish an UNRAM Adaptation Research Centre to advocate and facilitate the project's adaptation planning process and the scaling-out of adaptation strategies.



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FOR FURTHER INFORMATION

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